

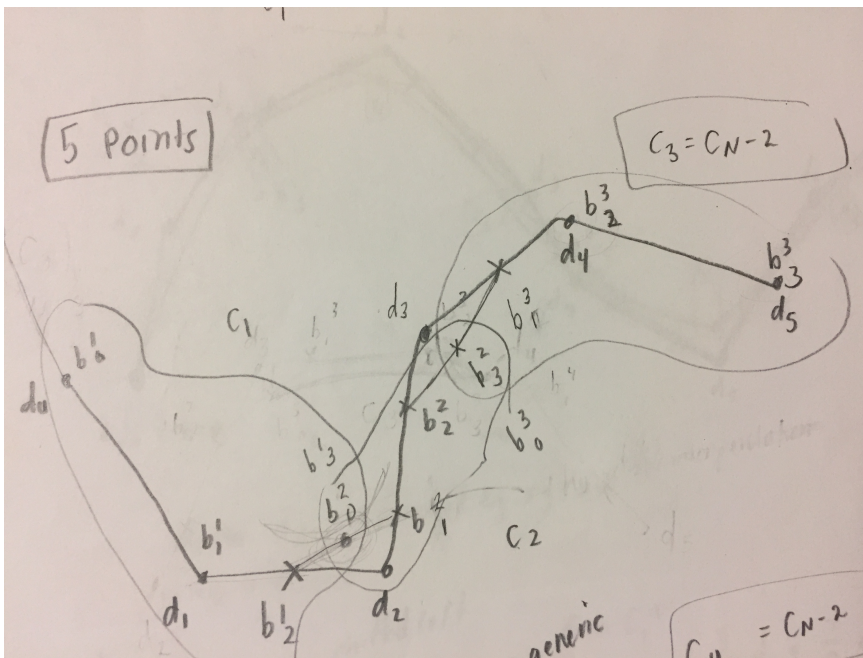
Fundamentals of Linear Algebra and Optimization

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Project 1

Problem 1

Adapt N=5 Case



(C1)

$$b_0^1 = d_0$$

$$b_1^1 = d_1$$

$$b_2^1 = \frac{1}{2}d_1 + \frac{1}{2}d_2$$

$$b_3^1 = \frac{1}{4}b_1^2 + \frac{1}{2}b_2^2 = \frac{1}{4}d_1 + \frac{7}{12}d_2 + \frac{1}{6}d_3$$

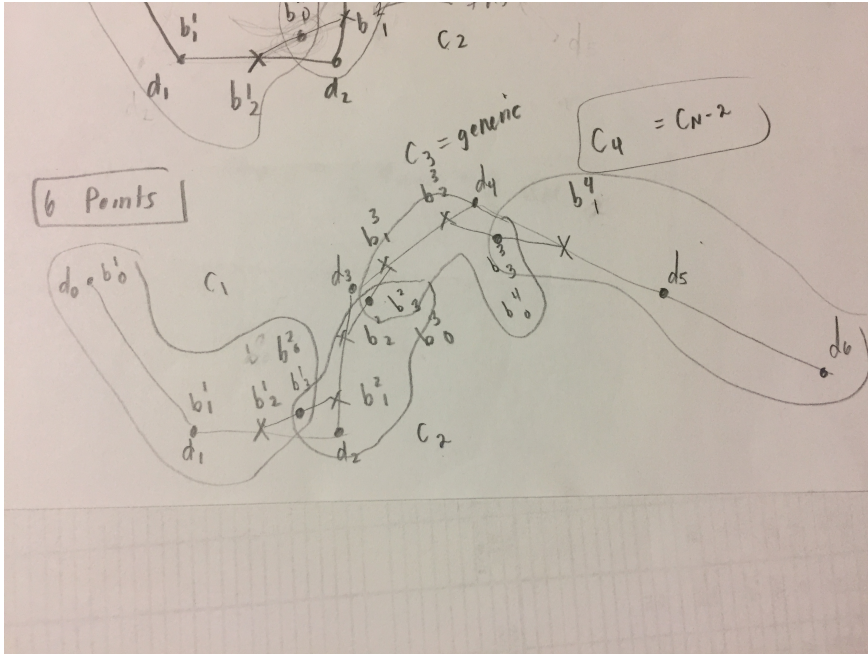
(C2)

$$\begin{aligned}
 b_0^2 &= \frac{1}{2}b_2^1 + \frac{1}{2}b_1^2 \\
 &= \frac{1}{4}d_1 + \frac{7}{12}d_2 + \frac{1}{6}d_3 \\
 b_1^2 &= \frac{2}{3}d_2 + \frac{1}{3}d_3 \\
 b_2^2 &= \frac{1}{3}d_2 + \frac{2}{3}d_3 \\
 b_3^2 &= \frac{1}{2}b_2^2 + \frac{1}{2}b_1^3 = \frac{1}{6}d_2 + \frac{4}{6}d_3 + \frac{1}{6}d_4
 \end{aligned}$$

(C3)

$$\begin{aligned}
 b_0^3 &= \frac{1}{2}b_2^2 + \frac{1}{2}b_1^3 = \frac{1}{6}d_2 + \frac{4}{6}d_3 + \frac{1}{6}d_4 \\
 b_1^3 &= \frac{1}{2}d_3 + \frac{1}{2}d_4 \\
 b_2^3 &= d_4 \\
 b_3^3 &= d_5
 \end{aligned}$$

Adapt N=6 Case



(C1)

$$\begin{aligned}b_0^1 &= d_0 \\b_1^1 &= d_1 \\b_2^1 &= \frac{1}{2}d_1 + \frac{1}{2}d_2 \\b_3^1 &= \frac{1}{4}b_1^1 + \frac{1}{2}b_2^1 = \frac{1}{4}d_1 + \frac{7}{12}d_2 + \frac{1}{6}d_3\end{aligned}$$

(C2)

$$\begin{aligned}b_0^2 &= \frac{1}{2}b_1^1 + \frac{1}{2}b_2^1 \\&= \frac{1}{4}d_1 + \frac{7}{12}d_2 + \frac{1}{6}d_3 \\b_1^2 &= \frac{2}{3}d_2 + \frac{1}{3}d_3 \\b_2^2 &= \frac{1}{3}d_2 + \frac{2}{3}d_3 \\b_3^2 &= \frac{1}{2}b_1^2 + \frac{1}{2}b_2^2 = \frac{1}{6}d_2 + \frac{4}{6}d_3 + \frac{1}{6}d_4\end{aligned}$$

(C3)

$$\begin{aligned}b_0^3 &= \frac{1}{2}b_1^2 + \frac{1}{2}b_2^2 = \frac{1}{6}d_2 + \frac{4}{6}d_3 + \frac{1}{6}d_4 \\b_1^3 &= \frac{2}{3}d_3 + \frac{1}{3}d_4 \\b_2^3 &= \frac{1}{3}d_3 + \frac{2}{3}d_4 \\b_3^3 &= \frac{1}{2}b_1^3 + \frac{1}{2}b_2^3 = \frac{1}{6}d^3 + \frac{7}{12}d_4 + \frac{1}{4}d_5\end{aligned}$$

(C4)

$$\begin{aligned}b_0^4 &= \frac{1}{2}b_2^3 + \frac{1}{2}b_3^3 = \frac{1}{6}d^3 + \frac{7}{12}d_4 + \frac{1}{4}d_5 \\b_1^4 &= \frac{1}{2}d_4 + \frac{1}{2}d_5 \\b_2^4 &= d_5 \\b_3^4 &= d_6\end{aligned}$$

Adapt N=4 Case Not yet updated

(C1)

$$\begin{aligned}b_0^1 &= d_0 \\b_1^1 &= d_1 \\b_2^1 &= \frac{1}{2}d_1 + \frac{1}{2}d_2 \\b_3^1 &= \frac{1}{4}b_1^2 + \frac{1}{2}b_1^2 = \frac{1}{4}d_1 + \frac{7}{12}d_2 + \frac{1}{6}d_3\end{aligned}$$

(C2)

$$\begin{aligned}b_0^2 &= \frac{1}{2}b_2^1 + \frac{1}{2}b_1^2 \\&= \frac{1}{4}d_1 + \frac{7}{12}d_2 + \frac{1}{6}d_3 \\b_1^2 &= \frac{2}{3}d_2 + \frac{1}{3}d_3 \\b_2^2 &= \frac{1}{3}d_2 + \frac{2}{3}d_3 \\b_3^2 &= \frac{1}{2}b_1^2 + \frac{1}{2}b_1^3 = \frac{1}{6}d_2 + \frac{4}{6}d_3 + \frac{1}{6}d_4\end{aligned}$$

Problem 2